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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/902,439

07/10/2001

Arcangelo Bruna

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08/18/2004

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EXAMINER

CHEN, WENPENG

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 08/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/902,439

Applicant(s)

BRUNA ET AL.

Examiner

Wenpeng Chen

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28-34 is/are allowed.
- 6) ☒ Claim(s) 16,22,23,26,27,35,36,43,44,48 and 49 is/are rejected.
- 7) ☒ Claim(s) 17-21,24,25,37-42,46,47 and 50 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>4</u> . | 6) <input type="checkbox"/> Other: _____ |

Specification

1. The disclosure is objected to because of the following informalities.

-- The meaning of expression " $S=0, 2$ " in line 25, page 15 is not clear. Does it mean $S=0$ or 2? or $S=0.2$? or S from 0 to 2?

-- Similarly, the meaning of expression " $\alpha=0, 6$ " in line 20, page 21 is not clear.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 16, 22-23, and 35-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakagawa et al. ("DCT-based still image compression ICs with bit-rate control," Nakagawa, Masaki, et al. IEEE Trans. On Consumer Electronics, v. 38, no. 3, August 1992, pages 711-712 cited in IDS paper #4.)

For Claims 35-36, Nakagawa teaches a device for compressing a digital image comprising a matrix of elements, each element comprising a plurality of digital components different types for representing a pixel, the device comprising:

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-- discrete cosine transform (DCT) means for splitting digital image a plurality of blocks, and calculating for each block a group of coefficients for the digital components of different types; (right column, page 711, left column, page 712, Fig. 4)

-- quantization means connected said DCT means for quantizing the DCT coefficients for each block using a corresponding quantization table scaled by a gain factor for achieving a target compression factor; ("quantizer" of Fig. 4)

-- energy means for determining at least one energy measure digital image; ("block activity" in Fig. 4; right column, page 713; section 4-2 Activity in page 714))

-- estimation means for estimating the gain factor as function the at least one energy measure, the function being determined experimentally according to the target compression factor; (sections 4-3, and 4-4 in pages 714-715; Fig. 6; The K value is the gain factor.)

-- wherein said DCT means define a compression unit; wherein said estimation means comprises a processor controlling compression of the digital image; the device further comprising: (1) a memory for storing the quantization tables (right column, page 713; Fig. 5; the tables being stored in a ROM) and (2) communication means for connecting said compression unit, said memory, energy means and said processor together, said processor estimating the gain factor based upon a program stored said memory. (Figs. 1 and 4; right column, page 713; section system composition; At least, the program is stored in the CPU.)

The above-cited passages also teach the method of Claim 16.

With regard to Claims 22-23, Nakagawa further teaches:

-- wherein each element of the digital image comprises a luminance component, a first chrominance component, and a second chrominance component; (See Y, Cb, and Cr in Table 1.)

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-- wherein the at least one energy measure comprises a total energy measure equal to a sum of an energy measure of the luminance components, an energy measure of the first chrominance components and an energy measure of the second chrominance components.
(equation (5) in page 714)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 26-27, 43-44 and 48-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukita et al. (US patent 6,424,739) in view of Nakagawa et al. ("DCT-based still image compression ICs with bit-rate control," Nakagawa, Masaki, et al. IEEE Trans. On Consumer Electronics, v. 38, no. 3, August 1992, pages 711-712 cited in IDS paper #4.)

Ukita teaches a digital still camera comprising:

-- an image acquisition unit for transmitting light corresponding to an image of scene;
(column 4, line 36 to column 7, line 9)

-- a sensor unit connected to said image acquisition unit for providing a digital image of scene, the digital image comprising a matrix of elements, each element comprising at least one digital component for representing a pixel, wherein each element comprises a plurality of digital components of different types and wherein each element the digital image comprises a

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luminance component, a first chrominance component, and a second chrominance component;
(column 4, line 36 to column 7, line 9)

-- a control device for compressing the digital image JPEG. (column 4, line 36 to column 7, line 9)

However, Ukita does not teach the details of providing target compression factor and compress the data with the factor as recited in Claim 43.

Nakagawa teaches a device for compressing a digital image comprising a matrix of elements, each element comprising a plurality of digital components different types for representing a pixel, the device comprising:

-- discrete cosine transform (DCT) means for splitting digital image a plurality of blocks, and calculating for each block a group of coefficients for the digital components of different types; (right column, page 711, left column, page 712, Fig. 4)

-- quantization means connected said DCT means for quantizing the DCT coefficients for each block using a corresponding quantization table scaled by a gain factor for achieving a target compression factor; ("quantizer" of Fig. 4)

-- energy means for determining at least one energy measure digital image; ("block activity" in Fig. 4; right column, page 713; section 4-2 Activity in page 714))

-- estimation means for estimating the gain factor as function the at least one energy measure, the function being determined experimentally according to the target compression factor; (sections 4-3, and 4-4 in pages 714-715; Fig. 6; The K value is the gain factor.)

-- wherein said DCT means define a compression unit; wherein said estimation means comprises a processor controlling compression of the digital image; the device further

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comprising: (1) a memory for storing the quantization tables (right column, page 713; Fig. 5; the tables being stored in a ROM) and (2) communication means for connecting said compression unit, said memory, energy means and said processor together, said processor estimating the gain factor based upon a program stored said memory. (Figs. 1 and 4; right column, page 713; section system composition; At least, the program is stored in the CPU.)

It is desirable to control the size of compressed image with target compression in digital cameras so a user can expect to store a predefined number of pictures into a fixed-size memory. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use Nakagawa's compression system in Ukita's JPEG block to determine and use the target Q factor to achieve target compression because the combination enables a user to store a predefined number of pictures into a fixed-size memory.

For Claims 26-27, Ukita further teaches:

-- providing an incomplete digital image with least component missing in each element; obtaining the digital image from the incomplete digital image. (column 8, lines 47-54)

For Claims 26-27, Nakagawa further teaches:

-- storing digital image in a memory and concurrently performing the determining of the at least one energy measure and the estimating the gain factor; and reading digital image from the memory for performing the splitting of the digital image and the quantizing the DCT coefficients. (left column, page 712; the image data being stored in the frame memory)

The combination thus teaches:

-- providing an incomplete digital image with least component missing in each element; obtaining the digital image from the incomplete digital image; storing digital image in a memory and concurrently performing the determining of the at least one energy measure and the

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estimating the gain factor; and reading digital image from the memory for performing the splitting of the digital image and the quantizing the DCT coefficients;

-- providing an incomplete digital image with at least one component missing in each element; obtaining the digital image from the incomplete digital image for performing the determining of the least one energy measure and the estimating of the gain factor; obtaining digital image from the incomplete digital image again performing the splitting the digital image and the quantizing of DCT coefficients.

Allowable Subject Matter

6. Claims 17-21, 37-42 and 45-47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter. The prior art fails to teach the method of Claim 17, the device of Claim 37, and the camera of Claim 45 that specifically comprise the following features in combination with other recited limitations:

-- ***estimating a first number of bits required to encode the AC coefficients*** of all the blocks ***using the quantization tables scaled by a pre-set factor as a function of the least one energy measure***, the first function being determined experimentally according to target compression factor;

-- calculating a second number of bits required encode the DC coefficients as recited;

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-- *estimating a basic compression factor* provided by the quantization tables scaled by the pre-set factor *according to the first number of bits and the second number of bits*;

-- *estimating the gain factor as a second function of the basic compression factor*, the second function being determined experimentally according to the target compression factor.

7. Claims 24-25 and 50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter. The prior art fails to teach the method of Claim 24 and the camera of Claim 50 that specifically comprise the following features in combination with other recited limitations:

-- *calculating a horizontal Sobel image and a vertical Sobel image* as recited;
-- *calculating a total Sobel image by summing horizontal Sobel image and the vertical Sobel image*;
-- *summing an absolute value of each element of the total Sobel image*.

8. Claims 28-34 allowed.

The following is a statement of reasons for the indication of allowable subject matter. The prior art fails to teach the method of Claim 28 that specifically comprises the following features in combination with other recited limitations:

-- *estimating a first number of bits required to encode the AC coefficients* of all the blocks *using the quantization tables scaled by a pre-set factor as a function of the least one*

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energy measure, the first function being determined experimentally according to target compression factor;

-- calculating a second number of bits required encode the DC coefficients as recited;

-- *estimating a basic compression factor* provided by the quantization tables scaled by the pre-set factor *according to the first number of bits and the second number of bits*;

-- *estimating the gain factor as a second function of the basic compression factor*, the second function being determined experimentally according to the target compression factor.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 703 306-2796. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703 308-7452. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications. TC 2600's customer service number is 703-306-0377.

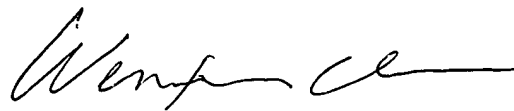
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-4700.

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Wenpeng Chen
Primary Examiner
Art Unit 2624

August 13, 2004

A handwritten signature in black ink, appearing to read "Wenpeng Chen", written in a cursive style.

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